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Subject: Forest Health Protection Report BFO-PR-05-03

To: Forest Supervisor, Boise NF

Enclosed is Forest Health Protection project report, BFO-PR-05-03. In this report, Carl Jorgensen, Boise Field Office Entomologist, evaluated the biological control agent, *Mecinus janthinus*, for population establishment and impacts to Dalmatian toadflax near Atlanta, ID. The objective of the monitoring was to determine the establishment of *M. janthinus* from previous releases, and document its impacts to the Dalmatian toadflax population. Charlie Swearingen, Idaho City Ranger District Range Technician, initiated the releases of *M. janthinus* and other biological agents for Dalmatian toadflax near Atlanta, but he was not able to determine biological control agent establishment or impacts on the weed.

If you have any questions, please contact Carl Jorgensen at 373-4225 or Dayle Bennett at 373-4227 in the Forest Health Protection Boise Field Office.

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/s/ Dayle D. Bennett (for)
WILLIAM W. BOETTCHER
Director, State and Private Forestry

Enclosure

cc: Warren Ririe, Joy C Roberts, Carl L Jorgensen, Dwight Scarbrough, Dayle D Bennett, Charles T Swearingen

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Monitoring *Mecinus janthinus* for Population Establishment and Impacts to Dalmatian Toadflax near Atlanta, ID

Report: BFO-PR-05-03

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April 15, 2005

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Introduction

The Dalmatian toadflax infestation around Atlanta, ID was approaching 3,000 acres in 2004. Conventional efforts and previous biological control releases have failed to manage the weed, so stem-boring weevils, *Mecinus janthinus*, were released in 2000. Additional releases were made in 2001, 2002, and 2003. Other agents released in the Atlanta area include: toadflax flower-feeding beetle, *Brachypterous pulicarius*; toadflax seed weed capsule weevil, *Gymnetron antirrhini*; and toadflax moth, *Calophasia lunula*. *Brachypterous pulicarius* historically has reduced seed production on yellow toadflax, but *B. pulicarius* impacts on Dalmatian toadflax are still unclear. *Gymnetron antirrhini* is widely distributed on yellow toadflax, but it is unknown if 1998 releases of *G. antirrhini* in Montana and Wyoming established on Dalmatian toadflax, as well as the 2001 release sites near Atlanta. These other insects have established on yellow toadflax, but have not been shown to establish and impact Dalmatian toadflax populations in the West.

Mecinus janthinus has reduced Dalmatian toadflax densities at a number of sites in British Columbia and is well established and has shown to impact Dalmatian toadflax densities in northern Idaho and eastern Washington. The objectives of the monitoring were to determine if *M. janthinus* has established and if there are impacts to the Dalmatian toadflax at the release sites near Atlanta. Monitoring was concentrated on the *M. janthinus* release sites for two reasons. The first reason is the other biological control agents are more adapted to yellow toadflax and likely did not establish near Atlanta. The second reason was these *M. janthinus* release sites have not had similar population increases and impacts on weed populations compared to sites in northern Idaho.

Methods

Eleven *M. janthinus* release sites were monitored near Atlanta during July 1-2, 2004. Release sites were located using a GeoExplorer 3 GPS unit and maps of the release sites. Charlie Swearingen, Forestry Range Technician, Idaho City Ranger District, assisted the crew in finding and monitoring the sites.

At each of the surveyed release sites, monitoring crews first conducted a 15-minute visual search for biological control agents and pinhole feeding damage by the adult weevils within 30 meters of the release site stake that monumented the release site. The weed stem counts per meter and weed height (cm) were recorded in the cardinal directions at 5, 10, and 15 meters from the release site stake. Percent cover for the target weed, tree, shrub, forbs, grass, litter, bare ground, and rock was estimated and recorded for the area within 30 meters of the release site stake. The stems per meter, weed height, and percent cover data were recorded to provide baseline data for comparison of future readings of the site.

The *M. janthinus* populations at the release sites were evaluated and recorded into one of the following categories:

1. "**None**" was recorded when no agents and no damage from the weevils on Dalmatian toadflax were found.

2. "**Present**" was recorded when less than five *M. janthinus* were found, or pinhole-feeding damage from the adult weevils was found in absence of weevils.

3. "**Established**" was recorded when more than one to five weevils per minute were found, or there was pinhole-feeding damage on most of the Dalmatian toadflax plants.

4. "**Marginally collectable**" was recorded when 6-15 weevils per minute were found indicating a healthy population of breeding adults and there was pinhole-feeding damage on most of the Dalmatian toadflax plants.

5. "**Collectable**" was recorded when weevil counts of greater than 20 per minute were found indicating the weevil population is in outbreak status and the population ready for redistribution.

Results

A total of 11 sites were monitored for *M. janthinus* and Dalmatian toadflax population levels. The insects or damage caused by the insects were found at all but two of the sites. At sites Unburn 3 and Unburn 4, no agents or evidence of the agents were found (Figure 1). The *M. janthinus* populations at eight surveyed sites were classified as "present". Fewer than five adult weevils were found and there was some pinhole feeding damage by the adult weevils found on the Dalmatian toadflax. The Riverbottom site was the only site classified as "established." There was excessive feeding damage and five adults were found at this site. Because of the amount of feeding damage to the Dalmatian toadflax and the number of adults found, the Riverbottom site probably has the highest population of *M. janthinus* in the Atlanta area.

Discussion and Recommendations

Although it appears *M. janthinus* has become or will become established in the Atlanta area, it has not had the same impacts to the Dalmatian toadflax populations as reported by land managers in the northern Idaho. These sites should be monitored in the future to continue evaluating and documenting the establishment of *M. janthinus* and associated impacts on the Dalmatian toadflax.

There are several improvements that can be made to the sampling protocol and classification of *M. janthinus* populations. The first improvement is to drop the "present" population classification, and use "established" as the classification, to indicate presence and establishment of the weevils. If there were biological control agents near the release site after 2 or 3 years from release, the biological agents were present and have established a breeding population that can persist on the site.

The second improvement is to change the sampling protocol for these weevils. During the visual surveys, the insects can fall from the plant before the observer sees them. A sampling technique that should be implemented is to use a bucket during the visual survey and gently shake or tap the plants over the bucket. *Mecinus janthinus* reacts to such motion by playing dead and falling from the plant. The bucket can be utilized to collect the falling weevils to get a more accurate count of the number of adults feeding in an area. Another change to the sampling protocol is to evaluate the last year stems for larval and pupal activity. The toadflax stems from last year can be split open to show the *M. janthinus* pupal chambers, larval galleries, and egg laying sites by the female weevils.

In late June 2005, Charlie Swearingen and I will meet with Mark Schwarzlaender, University of Idaho Biological Control Specialist, to compare Mark's release sites in northern Idaho with the releases that Charlie has made on the Boise National Forest near Atlanta. Mark has had success in establishing *M. janthinus* sites in northern Idaho and is also puzzled by the lack of population buildup in the Atlanta area. Through our collaboration, we hope to determine why the *M. janthinus* populations at the Atlanta sites are not increasing like those in northern Idaho.

It is a positive sign that the weevils have established at most of the Atlanta release sites and we expect they will likely begin to impact the Dalmatian toadflax population. Some releases of biological control agents take longer to develop due to environmental or other conditions. At the Atlanta sites, *M. janthinus* populations may or may not increase to levels that cause significant damage to Dalmatian toadflax. Theses release sites should be monitored the next few years to determine if the weevil population increases and what affect it has on the target host.

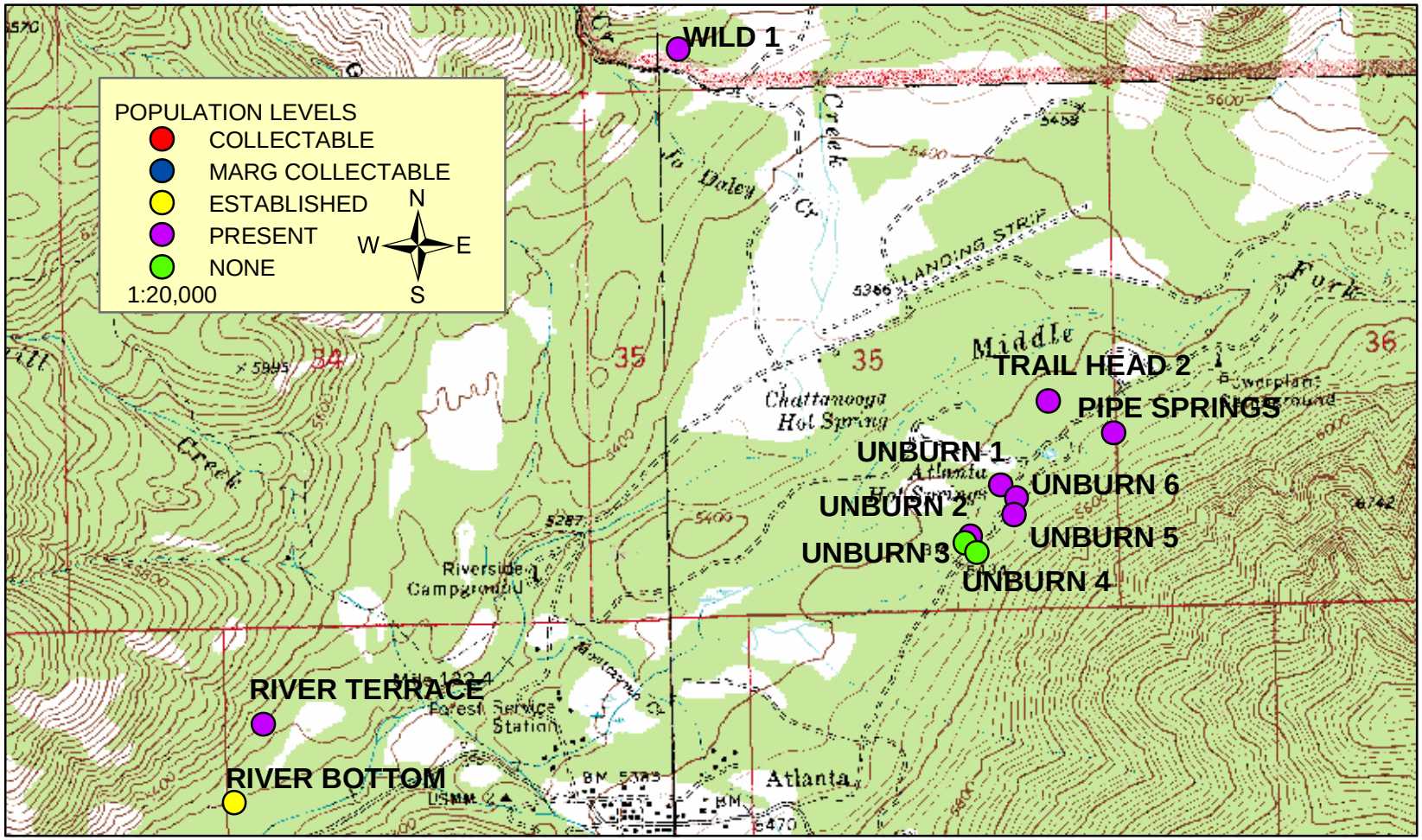

Figure 1. Estimated *Mecinus janthinus* population levels on Dalmatian toadflax at release sites near Atlanta, ID in 2004.

Appendix 1. Summary table for monitoring *Mecinus janthinus* on Dalmatian toadflax at release sites near Atlanta, ID, July 1-2, 2004.

Site Name	Weather	Air Temperature (Fahrenheit)	Wind	Percent of Weed Stage				Weed Patch		No. of
				Seed	Bolt	Bud	Flower	Acres	Population Level	Agents
RIVER TERRACE	PARTLY CLOUDY	61-70	CALM	0	0	20	80	1-10	PRESENT	0
RIVER BOTTOM	PARTLY CLOUDY	61-70	CALM	0	0	20	80	1-10	ESTABLISHED	5
TRAIL HEAD 2	PARTLY CLOUDY	61-70	MODERATE	0	20	20	60	1-10	PRESENT	4
PIPE SPRINGS	CLOUDY	61-70	MODERATE	0	20	20	60	1-10	PRESENT	3
UNBURN 1	CLOUDY	71-80	LIGHT	10	20	20	50	1-10	PRESENT	1
UNBURN 2	CLOUDY	61-70	LIGHT	10	0	20	70	0.25-1	PRESENT	3
UNBURN3	CLOUDY	61-70	LIGHT	0	0	20	80	1-10	NONE	0
UNBURN 4	PARTLY CLOUDY	61-70	CALM	0	0	20	80	1-10	NONE	0
UNBURN 5	PARTLY CLOUDY	61-70	CALM	0	0	20	80	1-10	PRESENT	0
UNBURN 6	PARTLY CLOUDY	61-70	CALM	0	0	20	80	1-10	PRESENT	0
WILD 1	CLEAR	61-70	CALM	0	20	20	60	<.25	PRESENT	4

Appendix 1. Continued

SITE_NAME	Estimated Stems/meter	Weed Canopy Height (cm)	Percent Canopy Cover							COMMENTS
			Weed	Tree	Shrub	Forb	Grass	Litter	Bare Ground	
RIVER TERRACE	7.0	40	50	10	5	5	20	5	5	PIN HOLE FEEDING
RIVER BOTTOM	5.0	40	40	20	10	10	10	5	5	LOTS OF FEEDING SITES
TRAIL HEAD 2	5.0	65	80	5	0	5	10	0	0	DAMAGE PRESENT
PIPE SPRINGS	5.0	60	80	5	0	0	15	0	0	DAMAGE PRESENT
UNBURN 1	10.0	60	70	5	0	5	10	5	5	
UNBURN 2	10.0	60	60	5	5	10	10	5	5	
UNBURN3	10.0	60	70	5	5	5	10	5	5	
UNBURN 4	0.0	1	40	10	10	5	30	5	0	NO FEEDING
UNBURN 5	10.0	40	70	5	5	5	10	5	0	PIN HOLE FEEDING
UNBURN 6	10.0	50	70	5	5	5	10	5	0	PIN HOLE FEEDING
WILD 1	5.0	54	40	10	20	10	15	0	5	